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in the Netherlands

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A EUROPEAN PROJECT FOR A LARGE OBSERVATORY IN THE SOUTHERN HEMISPHERE*

For the exploration of the universe around us it is essential to make observations from both hemispheres of the Earth. This has, of course, been realized ever since astronomers became interested in the world outside the planetary system. Already in the early days of the large telescopes Sir John Herschel went to the Cape with an 18-inch telescope to extend to the southern skies the great survey of nebulae and double stars made in England by his father Sir William Herschel in the second half of the 18th century. In the years 1834 to 1838 during which John Herschel observed at the Cape he made a very important contribution to our knowledge of the southern hemisphere. Herschel's excursion was, of course, by no means the first occasion on which astronomical observations were made in the southern hemisphere. In the twenties the British Admiralty had installed a permanent observatory at the Cape, for determining accurate positions of stars. To this day the Cape Observatory has remained one of the most active centres of astronomical research in the southern hemisphere. Long before the foundation of the Cape Observatory very important observations of star positions had been made from 1751 to 1754 at the Cape of Good Hope by the French astronomer Abbé N. L. de la Caille. According to Sir David Gill (A History and Description of the Royal Observatory, Cape of Good Hope, London, 1913) this was the earliest serious effort to obtain knowledge of the southern hemisphere, except for Halley's expedition to St. Helena in 1676–1678. In the course of time, on each of the three southern continents, several other observatories came into being. Moreover, some of the northern observatories founded temporary or semi-permanent stations in the south. Though, in recent times, some southern observatories have been equipped with moderately large telescopes, and two of them, the Radcliffe Observatory in Pretoria and the Australian National Observatory on Mt. Stromlo, near Canberra, even acquired telescopes with an aperture of 74 inches, and though enormous amounts of observational work have been done, our knowledge of the southern hemisphere still lags far behind that of the northern sky. The cause of this is clear enough when one considers the distribution in geographical latitude of the astronomical observatories over the world (see the accompanying graph). The three telescopes of the most powerful class, with apertures of 2.5 m and more, are all in California (the 100-inch one on Mt. Wilson, the 200-inch one on Mt. Palomar and the 120-inch one at the Lick Observatory Mt. Hamilton). Many of the most important problems of astronomy can only be solved with these largest instruments. The total lack of such telescopes in the southern hemisphere would be crippling under any circumstance, for how can one obtain proper insight into the structure of the Galactic System if one third of it cannot be observed ? Actually, the disparity between observing possibilities in the north and the south is still more serious than indicated by this one-to-two-thirds ratio : The centre of the Galactic System is situated at a declination of –29°. From the northern observatories this can only be observed at such low altitudes that conditions are for from optimum. Now, in several ways the nuclear region of the Galactic System is its most interesting part. But it is so far away that observation of the stars populating it can only be adequately made with giant telescopes and under the best conditions, i.e. only from a southern station equipped with the best instruments.

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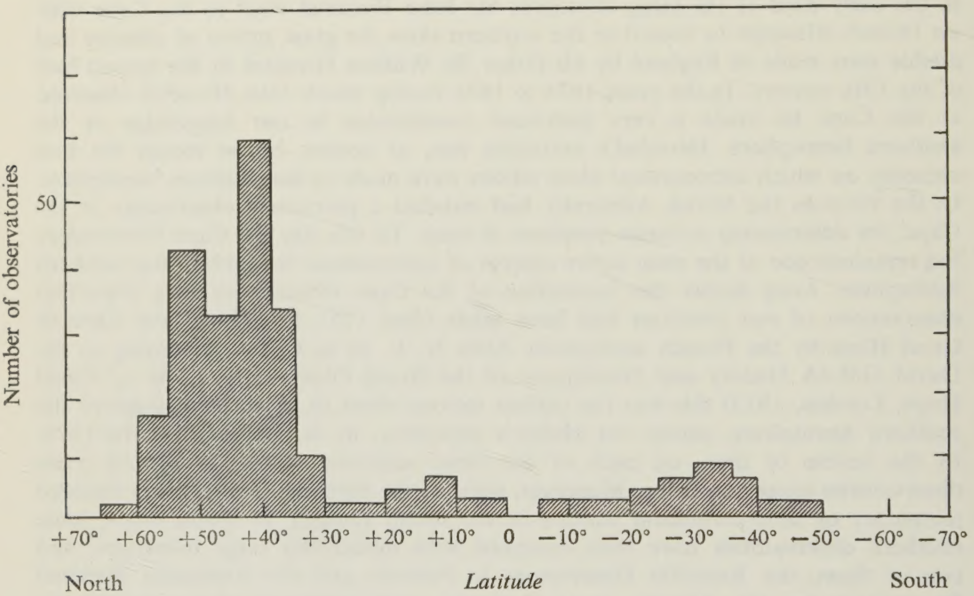
What is the special interest attaching to the study of the nuclear regions of our stellar system ?



Distribution of observatories in geographic latitude. (from R. Coutrez and L. Bossy, Ann. de l'Obs. Royal de Belgique, 3e Sér., Tome VI, 1954.

It is generally thought that the Galactic System originated as a consequence of large-scale density fluctuations in the gaseous medium filling the expanding universe in its early stages. Density and velocity fluctuations on a scale comparable with the dimensions of galaxies must have occurred at this epoch with sufficient strength to counterbalance locally the general expansion of the universe, and thus to hold the material in such a region together by the mutual attraction of its parts. The subsequent evolution must have been very complex, depending largely on the original form of the mass of gas detached from the universe, and on the large currents within it. As long as no stars were formed, the gas would contract; it would ultimately become strongly concentrated to the centre. If the original mass contained a considerable resultant angular momentum, it would finally contract to a thin rotating disk of gas, with, in general, a strong central concentration. The fact that a large fraction of the galaxies which we observe in our surroundings contain very flat disks, indicates that there must have been considerable large-scale angular momentum connected with the large density fluctuations in the universe.

The above picture of the evolution of a galaxy is extremely incomplete in two respects. Firstly, it is certain that from the earliest stages of this evolution the thin gaseous medium has condensed locally into *stars*. The stars formed in the early stages must have evolved rather differently from the interstellar *gas*. For, while the gaseous component of the galaxy could contract and lose the kinetic energy gained by this contraction through radiation, the *stellar* constituent of the galaxy could never contract to a thin disk through loss of kinetic energy. In the course of time most of the unevenness of the original distribution of these archaic stars would be smoothed out, and they would probably end up with a distribution that is more or less spherically symmetrical, but there is no way in which they could ever evolve into a strongly flattened system.

The star-formation process continued during the evolution of the gaseous constituent. Stars formed in a later stage, after the gas had contracted to a centrally condensed disc, will show a totally different distribution, corresponding more or less to the centrally concentrated disc of gas in this stage. The great density near the centre favoured the formation of stars in the nuclear regions. The gas remaining after this period of intense star-building must have shown a rather more homogeneous distribution over the disc, such as is observed in many galaxies at present. The distribution of the stars formed during the later stages of this development reflects this more homogeneous distribution : they are much less, if at all, concentrated towards the galactic centre.

It is of considerable interest to compare the characteristics of stars and star clusters found in the galactic nucleus, which must have been born in what might be called the "middle ages" of the Galactic System, with the constitution of the primeval star clusters in the almost spherical halo of the System, which must date from its earliest history, or, on the other side of the age scale, with the young stars and clusters in the surroundings of the Sun that are still being born at the present time. In this way one obtains information not only on the evolution of stars, but likewise on the evolution of the Galactic System as a whole, and on the changes that have occurred in the course of time in the constitution of the interstellar medium.

Possibly, a still more important reason why observations in the southern hemisphere may be more interesting than those in the north, is the presence of the Clouds of Magellan. These are two irregular stellar systems outside our own Galactic System, which are by far the nearest of the greater external galaxies. They are roughly ten times closer than the Andromeda nebula, which is the greatest of the near-by stellar systems observable in the north. The Magellanic Clouds are situated rather close to the south pole, and therefore cannot be seen at all from northern observatories. Because of their detached situation they can be surveyed incomparably better than our own Galactic Sytem, in particular for supergiant stars. There is no better way of calibrating the intrinsic brightness of these supergiants than through observations in the Magellanic Clouds. This is a matter of immense importance for our knowledge of the universe, because the distance scale in the universe depends entirely on these supergiants. However, a satisfactory calibration of these stars can only be obtained by tying them to much fainter stars, which can be properly observed only by means of a very large and well-equipped telescope.

It is for these and similar reasons that in 1953 the idea arose of a European Southern Observatory (abbreviated as E.S.O.). It came up in a discussion with Dr. W. Baade, astronomer at the large Mt. Wilson and Palomar Observatories in southern California, during a several months' sojourn in The Netherlands. In the same year an informal committee was set up by astronomers from six European countries particularly interested in the fields of research such an observatory would cover. *

Nothwithstanding the fact that the plan was warmly supported by astronomers in Europe as well as America, the difficulty of getting sufficient financial support for an international project of so little practical usefulness turned out to be discouragingly great. It was only seven years later, at a meeting convened by the French Government in December 1960, that a definitive text for a convention was agreed upon by government representatives from Belgium, France, Germany, Sweden and The Netherlands. A considerable appropriation by the Ford Foundation provided a great impetus in arriving at this decision.

It is still uncertain whether the British astronomers will join in the enterprise. Britain's position differs from that of the other countries mentioned, because the United Kingdom already maintains two rather large observatories in South Africa, while their Commonwealth partner, Australia, possesses a large observatory; also, the foundation of a larger Commonwealth Observatory is being seriously considered.

The principal instrument of the European Southern Observatory will be a telescope of 3-m aperture. The second largest instrument will be a telescope of the Schmidt type, with a free aperture of about 120 cm. The latter instrument, which will be a counterpart of the large "Schmidt" on Mt. Palomar, is intended as a survey instrument. It has a large field, and will among other things be used to extend the surveys in blue and in yellow light made on Mt. Palomar to the south pole. It is, moreover, a necessary complement to the 3-metre parabolic reflector, whose field of good definition will not be more than 20 or 30′ in diameter.

In addition to these principal telescopes a meridian circle will be erected for the purpose of obtaining accurate positions of the brighter stars, to serve as standards for photographic determination of positions and motions of stars in general. During the last decades practically all the southern work on stellar positions and proper motions has been concentrated in one single observatory, the Royal Observatory, Cape of Good Hope. There is an urgent need to have at least one other southern observatory where regular series of fundamental observations can be efficiently made. It goes almost without saying that some smaller telescopes for special photometric and other purposes will be added to the equipment.

Although the official approval of the governments concerned for the entire project is only recently being obtained, funds had been made available in preceding years for the purpose of carrying out a site-survey. The selection of a site for a large telescope is a problem of considerable difficulty. The efficiency of the telescope will largely depend upon this choice. It is evident that the telescope must be erected in a region of low average cloudiness; but this is not the only condition to be fulfilled. Much of the work in modern optical astronomy depends on very precise photometric measurements. The accuracy required can only be obtained in the total absence of haze of any kind, and with a minimum of dust in the atmosphere. For the latter reason places near sea level are not generally suitable for a large observatory. Most large telescopes have indeed been erected at altitudes between 1200

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* The membership of the committee has varied slightly over the years. Its present members are: Mr. Bannier, Professors Blaauw, Bourgeois, Danjon, Heckmann, Lindblad and Oort, directors of, respectively the observatories of Groningen, Uccle (Brussels), Paris, Hamburg, Stockholm and Leiden. Mr. Bannier, who is director of The Netherlands Organization for Scientific Research, is Treasurer, Prof. Blaauw is Secretary, and the author of the article is President. Furthermore, Prof. Fehrenbach (Marseille) and Dr. Funke (director of the Swedish Research Council) have attended practically all meetings, while several other atsronomers have in certain periods taken active parts in the work of the committee.

and 2000 m. Even more important for the efficiency of a large instrument is the tranquillity of the atmosphere. In practice it is largely the turbulence in the atmosphere which limits the observations. In astronomical jargon this is called the "seeing". Many of the most crucial observations on Mt. Palomar can only be made on a relatively small number of nights with exceptionally good seeing.

The quality of the seeing is determined on one hand by conditions close to the telescope : it may be spoilt entirely by the dome sheltering the instrument, or by the turbulent motion of the air over the surrounding terrain. But in part it is also determined by turbulence in higher atmospheric layers.

By a judicious choice of the direct surroundings and by a good design of telescope tube and dome it is possible to avoid "local" turbulence almost entirely. The final choice of a site will have to depend largely on the quality of the higher atmospheric levels. However, it is extremely difficult to make a reliable survey of seeing conditions. On one hand it is almost impossible to mount small test instruments in such a way that they are not unduly influenced by local effects near the ground, so that it is difficult to disentangle the turbulence higher up in the atmosphere. On the other hand one is faced by the problem of the enormous long-range variability in weather conditions. Even in the dry subtropical regions in which the searches are made, the weather shows not only considerable seasonal variation, but it can also vary enormously from year to year, in cloudiness as well as in turbulence.

The surveys made so far under the auspices of the E.S.O. committee have been concentrated on various parts of South Africa. It was known from the long experience of some active observatories that general conditions were favourable in this part of the world. Very little was known about astronomical conditions on the other continents of the southern hemisphere. Only quite recently investigations were begun by Australian astronomers on their continent, while astronomers from the United States, together with their Chilian colleagues have last year started testing in the Andes ; the sites in Chile are, however, all rather difficult of access.

The tests made in South Africa have indicated particularly favourable conditions for a region in the Cape Province between —32° and —33½° latitude, in the Great Karroo. In the first months of 1961 a small temporary observatory will be built near the farms of Zeekoegat. The observatory will contain a telescope of 40-cm aperture provided with an objective prism designed especially for the wholesale determination of radial velocities of stars. The method for this was developed by Prof. Ch. Fehrenbach and has during recent years been very successfully applied by him to the determination of velocities of faint stars at the Observatoire de Haute Provence. An extension of this work to the southern hemisphere being one of the most important desiderata, it was decided to take up his research as the first astronomical programme sponsored by the European Southern Observatory project. During the first two years the observations will be made by astronomers from the Marseille Observatory. While collecting very important astronomical data, this special project will also provide an invaluable opportunity for obtaining information on seeing conditions on a scale greatly surpassing the possibilities of surveys such as have been carried out during preceding years. It is hoped to launch other astronomical programmes with small telescopes on sites some 100 km further to the north, in the region of Beaufort West. The final choice of the site for the large telescope will depend largely on the results yielded by observations in these temporary observatories.

A start will soon be made with the definitive design for the two major instruments, as well as for the two or three smaller, special-purpose instruments which will become part of the equipment of the final observatory. These latter may be ready in one or two years, while the 120-cm Schmidt telescope may be finished and erected in 1964. The final decision on the site – the country and the exact location in that country – will probably not be made until 1964, when the buildings for the 3-m telescope would have to be started. We expect that the large telescope will be ready for operation by 1968 or '69.

If the observatory were to built in so isolated a region as the Great Karroo, the observatory would probably have its main offices, library and measuring rooms in Cape Town. The astronomers using the large telescope would stay at the actual observatory only for relatively brief observing periods each month.

It is hoped, of course, that the country where the observatory is established will also participate in its activities.

In establishing this common observatory a new step has been taken towards tightening the ties of friendship and co-operation between scientific workers in the countries concerned. Though it is a small step in itself, we hope and expect that the exchange of ideas, techniques and styles of work which it will bring about will act as a stimulus to astronomical research in each of the countries participating.

J. H. OORT *

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* Dr. Oort is Professor of Astronomy in the State University at Leyden and Director of the Leyden Observatory.

Einstein and the University of Leyden

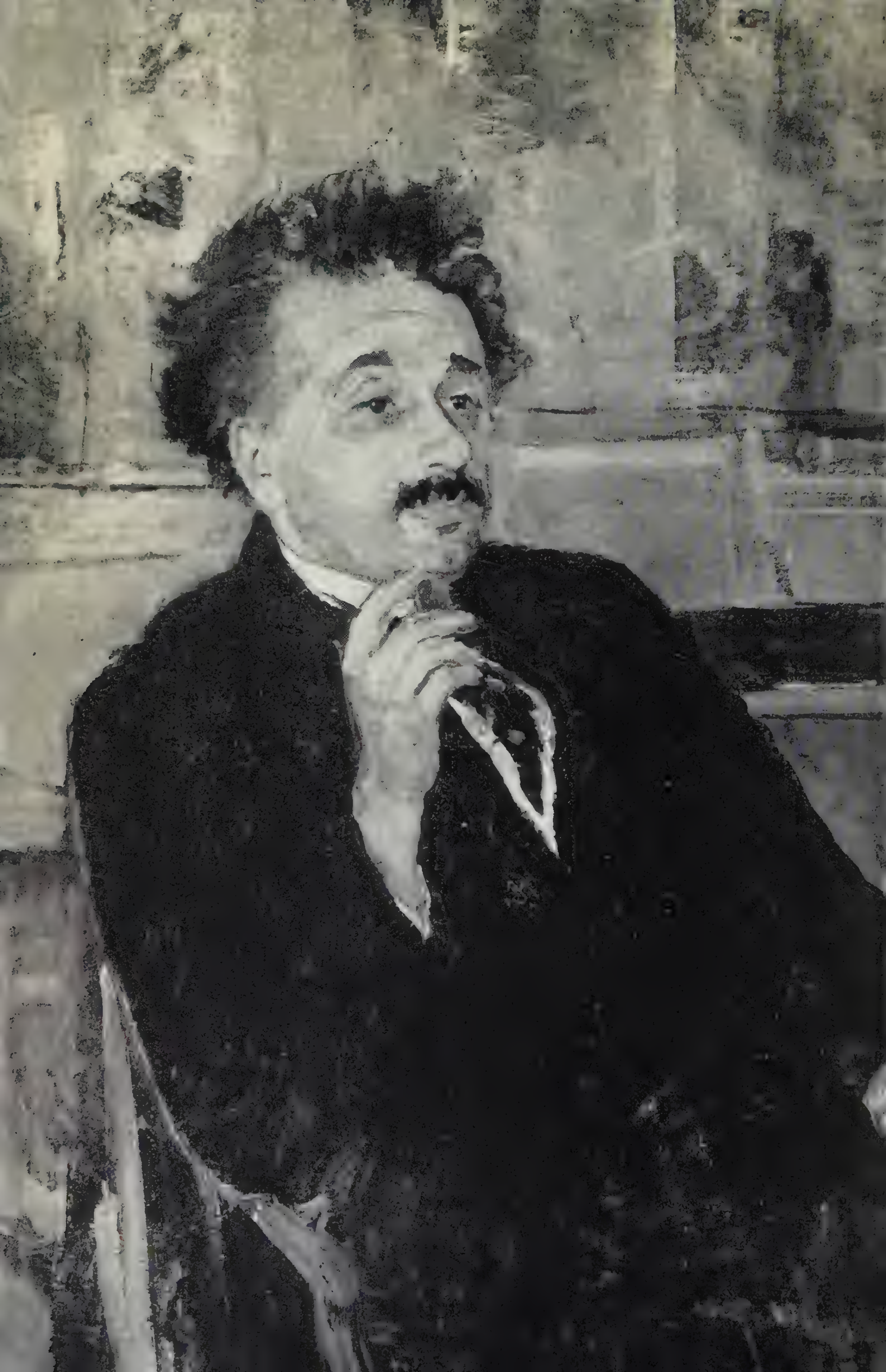
Sixty years ago, in 1901, when Albert Einstein had just completed his studies at the Polytechnical School at Zurich, he found himself soliciting right and left for a job. It is from that year that a reply-paid postcard dates which Einstein wrote to the Leyden physicist, Professor H. Kamerlingh Onnes, a facsimile of which will be found below. This postcard, with the unused reply half still attached, now lies in the National Museum of the History of Science at Leyden. If the rather formal Kamerlingh Onnes did actually reply to him by letter it will doubtless have been in the negative. Einstein obtained a post in the Patent Office at Berne and later became a professor at Prague.

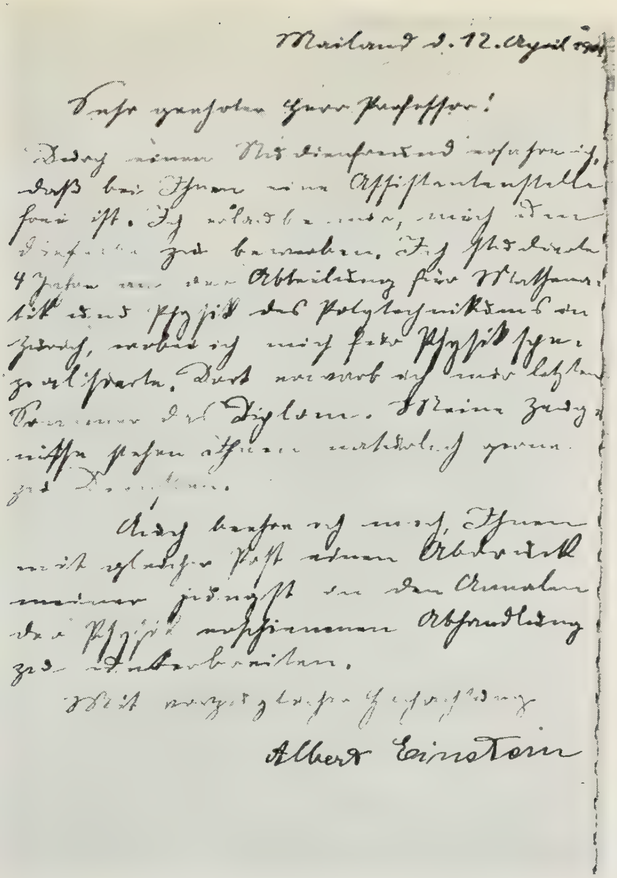
It was in 1911, now fifty years ago, that Einstein first visited Leyden, coming there to deliver a lecture to a students' society. Between this time and his retreat to the United States in 1933 he visited the university town regularly. In those years of physics' headlong advance, the University of Leyden was an important centre of activity. In 1908 Kamerlingh Onnes had succeeded in liquefying helium gas by means of extremely low temperatures and in 1913 he was awarded the Nobel Prize for Physics in recognition of this achievement. Then there was H. A. Lorentz, who paved the way to the theory of relativity with his contraction hypothesis. In 1953 Einstein wrote a character sketch of this Dutch man of learning (reproduced in full in the first issue of this bulletin, Vol. I, No. 1), saying: "For me personally, he meant more than all the others I have met on my life's journey". Einstein was also united by close ties of friendship with Lorentz's successor at Leyden in the chair of mathematical physics, P. Ehrenfest.

In June 1920 a Royal Order in Council authorized the Leyden University Fund to set up a special chair in physics in order to be able to have Albert Einstein at the university to fill it, and it was in October of that same year that the delivered his inaugural lecture, entitled "Ether and the Theory of Relativity".

As a rule, Einstein would come to Leyden once or twice a year to give a series of lectures and on these occasions he would lodge in the house of his friend, Ehrenfest. In these periods long discussions took place among Einstein, Lorentz, Kamerlingh Onnes, Ehrenfest and W. H. de Haas. But time was also reserved for recreation and for music, Einstein being an excellent violinist and Ehrenfest a pianist. During a visit in 1920, another Kamerlingh Onnes, a nephew of the professor, painted Einstein's portrait, which portrait has hung in Leyden University ever since. A reproduction of it will be found accompanying this note.

The letters Lorentz wrote to Einstein between 1911 and 1926 are now the property of the National Museum of the History of Science in Leyden, having been presented to the museum by Einstein himself in 1953, while the letters Einstein wrote to Lorentz in return are in the keeping of the State Archives in The Hague.





Mailand d. 12. April 1901

Sehr geehrter Herr Professor!

Durch einen Studienfreund erfuhr ich, dass bei Ihnen eine Assistentenstelle frei ist. Ich erlaube mir, mich um dieselbe zu bewerben. Ich studierte 4 Jahre an der Abteilung für Mathematik und Physik des Polytechnikums in Zürich, wobei ich mich für Physik spezialisierte. Dort erwarb ich im letzten Sommer das Diplom. Meine Zeugnisse stehen Ihnen natürlich gerne zu Diensten.

Auch beehre ich mich, Ihnen mit gleicher Post einen Abdruck meiner jüngst in den Annalen der Physik erschienenen Abhandlung zu unterbreiten.

Mit vorzüglicher Hochachtung

Albert Einstein

Einstein's unsuccessful application for a post as assistant to Professor Kamerlingh Onnes.

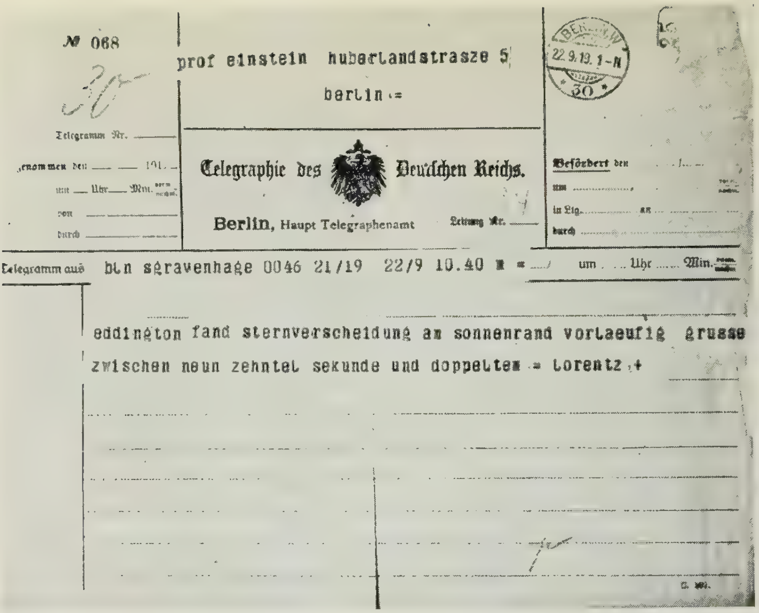
Milan, April 12, 1901.

Dear Professor,

From a student friend of mine I have heard that you have a vacancy for an assistant. I take the liberty of applying for this position. I studied mathematics and physics for four years at the Polytechnic at Zurich, specializing in physics. I obtained the diploma last summer. Naturally, I shall be only too glad to send you references. I am also taking the liberty of sending you by the same post a copy of a study of mine which recently appeared in the *Annalen der Physik*.

Yours very respectfully,
Albert Einstein

Photo on left: *Portrait of Albert Einstein at the age of 41 (1920), painted by H. Kamerlingh Onnes and presented to the Board of Curators of the State University at Leyden.*



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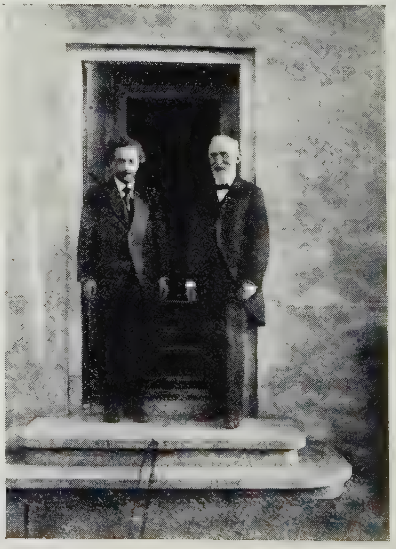
1919. After the first world war, the Dutch – who had remained neutral as a nation – bent their efforts towards re-establishing scientific and academic contacts between the two camps. The telegram from Lorentz to Einstein dates from this period, when direct contact between England and Germany had yet to be renewed. The telegram is of historical significance for it contains a highly important confirmation of a phenomenon which Einstein had forecast some time before. The text of the telegram is slightly garbled : "Sternverscheidung" should be "Sternverschiebung" and "grusse" should be "grösse". In English it would read "Eddington has discovered a stellar shifting on the sun's perimeter, size at the moment between 9/10 (arc-) seconds and the double".



1921. Einstein and Lorentz on the step of Ehrenfest's house. This photograph was taken by Ehrenfest.

Photos : By courtesy of the National Museum of the History of Science, Leyden.

THE BACKGROUNDS OF UNIVERSITY STUDENTS IN THE NETHERLANDS

The increasing need for people with a university education has resulted in a growing demand for information regarding the flow of students to the universities. With this in mind, the Central Bureau of Statistics in the Netherlands has devoted a publication to the Social and Regional Background of University Students, 1958–1959,* comprising the results of an enquiry into the social background, ecclesiastical group and home environment etc., of all Dutch students at the universities and other institutions of higher education in the year 1958–1959. The enquiry was based on 32,000 individual registration forms.

1. Social background

The basis taken to determine the socio-economic and socio-cultural group from which a student comes is the father's occupation, as described by the student. These occupations can next be grouped to form three social milieux: the higher, the intermediate and the lower milieu. Occupations in the intermediate group are further distinguished according to the type of employment, resulting in the sub-divisions: intermediate-self-employed and intermediate-salaried.

This classification of milieux is not derived from any existing occupational stratification but has been based mainly on the cultural pattern that is assumed to coincide with the various occupational groups. This means that the milieux so distinguished do not *ipso facto* correspond with homogeneous economic groups. Thus the higher milieu group contains artists and ministers of the church as well as professors and industrialists. It can, however, be assumed that the lower milieu group consists for a large part of population groups with relatively low incomes.

The publication quoted shows that in 1958–1959 49 % of the students came from the higher milieu, 23 % from the intermediate-salaried, 22 % from the intermediate-self-employed and 8 % from the lower milieu.

If these figures are compared with the results thrown up by a similar enquiry covering the year 1954–'55, it is seen that as good as no change has come about in the students' social backgrounds.

Bearing in mind that an estimated 60 % of the population of the Netherlands belongs to the lower milieu, it will be seen that this lower milieu participates in higher education on a modest scale only. This is partly due to the fact that fewer young people from this group who have enjoyed a secondary school education (a condition for sitting for university examinations) go to a university. But the main cause is to be found in a preceding phase of education – compared with other groups, the children in the lower milieu also participate in secondary and preparatory education on only a modest scale too. Socio-economic and socio-psychological factors are the main influences here, such things as the high cost of study, loss of income, limited interest in general education at advanced levels.

The number of women students coming from the higher milieu (66 %) is relatively much greater than the number of male students from this group (45 %). Generally speaking, however, at most institutions of higher education the higher milieu also provides the largest group of men students too, especially at the State University at Leyden, where 58 % of the men come from this group. Then, too, the general universities as a rule attract relatively more students from the higher milieu than do the Technological Universities, the Schools of Economics or the Agricultural University. At the last mentioned institution of higher education a large number of sons of independent farmers study, a fact which is reflected in the high figure for those coming from the intermediate-self-employed milieu (39 %).

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* De Sociale en regionale herkomst der studenten bij het hoger onderwijs 1958–'59. Zeist, 1960.

In the preceding remarks another aspect of the social background has already been touched on, viz., the question whether certain milieux show a preference for certain branches of study. The enquiry shows that this is, in fact, the case, especially among men students.

The number of students taking medicine, dental surgery or law is relatively larger in the higher milieu than in the others. In contrast to this, the students coming from the intermediate-salaried group and from the lower milieu show more interest in mathematics, physics or the technical sciences. The differences between the milieux as regards choice of subjects are far less pronounced among women students. The only point deserving mention is that women students coming from the higher milieu tend to be more interested in taking law and less interested in taking medicine than do women students coming from the other milieux.

The differences noted are connected among other things with the choice of subject made by students whose fathers also enjoyed an academic education. This group forms in total 25 % of all students and it is noticeable that their interest in law, medicine and dental surgery is pronounced. Moreover, there is some degree of correspondence between the father's training and the choice of subject made by the sons. Thus, 54 % of the student sons of doctors chose their father's subject and 47 % of the sons of graduates of the Technological University. Among women students, however, there is hardly any question of a preference for the same subject as their fathers took.

2. Ecclesiastical group

In a country like the Netherlands, where the population clearly falls into a number of religious groups and where the religious denomination has a marked influence in all fields of communal life, the composition of the student population according to religious group is not without significance.

In 1958–'59, 24 % of the students proved to be Dutch Reformed, 11 % Calvinist, 30 % Roman Catholic, while 6 % belonged to some other religious denomination or other. 30 % of the students stated that they did not belong to any religious group. If the numbers of students per denomination is compared with the estimated number of people in the 18–29 years of age group of the population, similarly classified, considerable divergence is shown in the numbers in each group taking advantage of higher education. This is demonstrated by the following figures :

Religious denomination	No. of students per 1000 of the 18–29 years age-group
Dutch Reformed	15
Calvinist	18
Roman Catholic	11
Others	33
None	31
Total	17

These figures show, for instance, that although Roman Catholics form one of the largest groups among students, the percentage of young Roman Catholics taking a course of higher education is small compared with other groups. The average for all groups in the 18–19 years of age category is 17 per thousand, while that for Roman Catholics alone is only 11.

Despite the fact that in contrast to the Roman Catholics, the Dutch Reformed take for the most part their course of theological training at a university, so that they take a larger part in higher education, this group nevertheless lags behind the others. At the three Dutch institutions of higher education founded on a religious basis, the students are, of course, predominantly of the same religious persuasion as the institution itself. At the Free University at Amsterdam 75 % of them are Calvinists (*Gereformeerden*), and at the Roman Catholic University at Nymegen and the Roman Catholic School of Economics at Tilburg as many as 98 % of the students are Roman Catholic. But this does not by any means signify that all Calvinists or all Roman Catholics study at these institutes, for 52 % of all Calvinist students and 69 % of all Roman Catholic students are enrolled at others. This has to do with the fact that the universities of a given religious persuasion do not offer all courses. For technics, agricultural science, veterinary science and dental surgery, for instance, non-denominational institutions of higher education must be attended. Then, too, many students prefer the university which is nearest to their place of residence.

3. Home environment

Another aspect requiring attention is the students' home environment. Other enquiries have revealed that a link exists between interest in different forms of educational training on the one hand and the size and socio-economic structure of the place of residence on the other.

The present enquiry shows that differences exist as regards participation by young people in higher education both as between the towns and the rural areas and as between different towns, according to their social and economic function. Thus 45 % of all students come from towns which, generally speaking, have an administrative function, although only 29 % of the population between 18–29 years of age live in these towns. The towns which can by and large be taken as industrial centres have 22 % of this group of the population and supply 21 % of the student population. The suburban municipalities on the other hand, in which only 5 % of this group live, provide 13 % of the students, yet the rural areas provide only 21 % whereas as many as 44 % of this age-group of the population live in them.

These differences are clearly apparent in the figures per 1000 of the 18–29 years of age group as given below:

Home environment	No. of students per 1000 of the 18–29 years age-group
Rural areas	8
Industrial towns	15
Administrative towns	26
of which:	
small and medium-sized	22
large	27
Suburban areas	42
Total	17

These figures show the differences already mentioned but in addition that more young people from the large administrative centres follow courses of higher education than from the small and medium-sized administrative centres. A similar distinction according to size revealed no differences, however, when applied to the industrial centres.

The fact that there is a great interest in higher education among young people in the suburban areas is closely related to the fact that the better-off families of the towns usually reside in these areas. A relatively high proportion of the students originating from them also choose law as their subject, which accords with what has already been said of the higher milieu group. Finally, another striking feature is that students coming from the industrial centres tend to concentrate more on technical subjects and economics than those coming from the other home environments.

Summarizing, it can be said that the enquiry has made it evident that there are a number of groups in the population which participate to a lesser degree in higher education than others. Any measures which may be taken to meet the rising demand for academically trained persons in society by ensuring that everyone with the required capacities has the chance to follow a course of higher education should take account of these findings. Yet information regarding the students' backgrounds can also play a significant role in calculating the future dimensions of higher education, studies relating to the structure of such education and measures to provide student amenities.

G. A. VERHEUL *

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CHRONICLE

UNIVERSITY NEWS

Subsidizing private higher education in the Netherlands

The question whether private institutions of higher education in the Netherlands are supported by the State, and, if so, from what source, is easy to answer in a certain sense. The costs of the *recognized* private institutions are borne almost entirely by the Government and are paid for out of public funds.

This arrangement is based on the new Scientific Education Act which came into effect on January 1, 1961. In addition to the existing State universities and colleges and the (Municipal) University of Amsterdam, this Acts lists the recognized private universities and colleges, i.e., the Roman Catholic University at Nymegen, the Free (Reformed) University at Amsterdam, the (neutral) Netherlands School of Economics at Rotterdam and the Roman Catholic School of Economics at Tilburg.

The Act comprises a number of clauses which apply to all existing institutions of higher education, i.e. "the universities and colleges the costs of which are wholly or partly borne by public funds." A rule applying to all universities alike, for example, is that each must possess at least three faculties, including, in any case, the faculty of medicine or the faculty of mathematics and natural science.

Another group of clauses applies solely to the State universities and colleges. Others relate exclusively to the (Municipal) University of Amsterdam, which is a public institution. Finally, a number of rules have been laid down for the private institutions of higher education.

With respect to the State institutions the relevant provisions have the character of binding regulations, whilst for the private institutions they are to be regarded as validating conditions with which they must comply if they are to be considered for recognition and subsidy.

State institutions of higher education have acquired the status of bodies corporate and have their own revenue, consisting of enrolment, college and examination fees, of gifts, bequests and legacies, of income from services rendered and from capital and, finally, of an annual grant from public funds, the latter naturally constituting their principal source of income.

With respect to the University of Amsterdam, the State bears 95 per cent. and the Municipality of Amsterdam 5 per cent. of the allocation. The amount of the allocation is determined by the Minister of Education, and is included in the National Budget in accordance with estimates drawn up by the Board of Governors and provisionally approved by the Minister.

As regards the private universities, for several years now the State, on the grounds of a subsidy regulation dating from 1948 and last amended in 1956, has borne 90 per cent of the accommodation and running costs, though to cover the running costs these universities could never receive more than the equivalent of 60 per cent of the average expenditure of their sister universities. The State contributed 70 per cent of the accommodation and running costs of the private Schools of Economics.

Under the new Act, all recognized private institutions of higher education will receive a 95 per cent contribution towards their *net costs,* provided these do not exceed what is regarded as the norm for such costs. The State will also contribute 95 per cent of the costs which exceed this norm, provided the Minister of Education is satisfied that the expenditure was fully warranted. Furthermore, the State will make a contribution to the cost of providing student amenities (accommodation, restaurants) on the same basis as that applied to the State institutions of higher education.

By the term "net costs", the Act is referring to the difference between receipts and expenditure thrown up by the university's accounts for general services, teaching, research and its hospital, if any. The expenditure covers the value of sites and buildings which were the property of the institution, governing association or foundation, *before* they were taken over for university purposes.

The principle underlying the new arrangement is the desire to afford the private universities the same chances of development as the State universities, since they perform part of the nation's task in this field. It is a consequence of what is known in the Netherlands as the "pacification of education", i.e. the financial equality of public and private elementary education laid down in the constitution of 1917 and in the Elementary Education Act of 1920.

It accepted the principle that everyone has the right to have his children educated according to his convictions, and that the means thereto must be provided by the community. Since then this principle has been chiefly applied to advanced education, and has now been finally accepted for higher education as well.

Apart from the institutions mentioned above, there are a number of ecclesiastical schools for higher education in the Netherlands, such as a few (Reformed) theological colleges where clergymen receive their training, and several great (Roman Catholic) seminaries where priests are trained. These schools did not fall under the old Act, nor are they dealt with in the new Act. They are not, in fact, regarded as forming part of higher education in the strict sense of the word. Nor do they award academic degrees. Moreover, they cherish their independence, free from the subsidies which would involve a certain amount of State control over religious affairs.

In addition, the Act allows for the possibility of the Crown conferring, upon request, on a private institution of higher education the status of a university or college, enjoying the same rights as the State institutions with respect to the granting of doctorates and testimonials.

The new institutions are, of course, meant here and not those already listed in the Act. For the rest, such a designation is by no means a simple matter. Together with a request for such status, and in addition to submitting the statutes and rules, proof must be submitted that the founders have transferred to the institution capital to a value of 500,000 guilders. Furthermore, the institution – as is compulsory for those already recognized – must possess at least three faculties (including one of medicine or one of mathematics and natural science), or, in the event of it being a technical university, must possess four departments, each faculty or department having a staff of at least five full-time professors.

Obviously, the founding of an institution which meets these conditions is an extremely costly affair, all the more so, since for the time being it can only lead to the designation referred to and to the recognition of the doctor's degrees it confers. The designation does not carry with it a subsidy, nor does it concede that any legal claim to such may be made in the future. The Act, in fact, does *not* state that such an institution, once "designated", will be included, after an amendment of the law, among the institutions listed and currently receiving subsidies after a certain period has elapsed or after it has complied with certain further conditions. Though the possibility of this happening exists, it can, as stated, only be brought about by an amendment of the Act.

It should be noted that the private universities and colleges which are recognized at present and are mentioned in the Act, were each in turn designated by law as institutions competent to award doctorates. Subsidy regulations evolved quite independently of this. The situation is now such that in order to become one of the institutions "the costs of which are paid wholly or partly out of public funds" an amendment of the Act is necessary. This applies equally, however, to new State universities and colleges to be created by an amendment of the Act.

Though it could be concluded from these provisions that the designating – and *a fortiori* the subsidizing – of new private institutions are greatly hampered, they should preferably be regarded as certain "guarantees of validity."

The fact that the principle of the financial equalization of public and private education in the Netherlands has generally been accepted, and has recently also been laid down in the Higher Education Act, guarantees the co-operation of the authorities in the development of private institutions, whenever they prove viable. In view of the fact, however, that, as previously stated, the equipment of a university or college is a money-devouring undertaking, lengthy and deeply probing consultations are necessary between prospective founders and the authorities before a private institution can come into being.

In plans pertaining to the spreading of higher education, such as laid down in the memorandum submitted to the States General in January 1961 by the Minister of Education, the possibility of a private institution being developed with complete government support is explicitly stated.

RESEARCH

Measuring the polarization of radio-radiation at Dwingeloo

For the first time in the history of radio astronomy it has become possible to prove beyond all doubt that part of the radio-radiation from the universe is polarized. This is due to the fact that Dutch radio astronomers, working at Dwingeloo* with a highly specialized receiver and a radio telescope exceedingly well suited to the purpose, have succeeded not merely in measuring this extremely weak radiation but also in analyzing it.

This was announced by Professor H. C. van de Hulst, professor of theoretical astronomy in the State University at Leyden, during an address delivered to the Natural Science Department of the Netherlands Royal Academy of Sciences and Letters.

The electro-magnetic waves which penetrate the earth's atmosphere from the universe and which can be detected with radio telescopes consist of vibrations in numerous directions. The measurements taken in November and December last showed that a small portion of the radiation from some areas of the heavens chooses to vibrate in one particular direction. This result was forecast by theoretical calculations designed to explain the origin of the radio-radiation. This theory, however, has to be proved and radio astronomers in various countries have been endeavouring in recent years to produce this proof, so far with negative, or at least highly doubtful, results. According to the theory, part of the radio-radiation is emitted by rapidly moving electrons under the influence of magnetic forces. These electrons, which move at speeds almost equal to that of light, describe enormous spiral courses through the Milky Way. When they arrive on the earth they can be observed by cosmic radiation. In 1948, on the basis of observations made with optical telescopes, it began to be supposed that magnetic forces were also at work in the Milky Way. As a result of the recent observations in Dwingeloo this suspicion has become a certainty. After this first, successful period of observation it is now the intention to expand the existing equipment to an extent which will make it possible to explore the entire heavens by which an idea may be obtained of the structure of the magnetic field in the Milky Way System. Opinion is growing that the spiral arms seen in other systems of stars, the existence of which in our own Milky Way System was demonstrated some years ago, thanks to Dutch and Australian radio astronomical observations, owe their continued existence to this magnetic field.

The measurements of polarization at present being carried out provide the theoreticians with an opportunity to pursue their calculations with greater confidence. The receiver was constructed by Ch. L. Seeger and K. J. van Damme. The observations were made and elaborated by Seeger, G. Westerhout, J. Tinbergen and W. Brouw.

The significance of aerial survey

At the ordinary session of the Natural Science Department of the Netherlands Royal Academy of Sciences held on May 27, 1961, Professor W. Schermerhorn, director of the International Training Centre for Aerial Survey at Delft, delivered an address on "The Significance of Aerial Survey to the Present World Population".

Although aerial photography is used on a large scale, both in the highly developed and the development countries, and while both the methods employed and the equipment used come exclusively from the first-mentioned areas, Professor Schemerhorn preferred to explain the significance of aerial photography in the present stage of world development, and, in particular, in the development countries.

Aerial photography has not developed simply as an effective instrument for all manner of special espionage techniques, but above all as the only means of opening up large areas of the earth in a reasonably short period of time. In recent years Russia has produced a map on the scale of 1 : 100,000 of the entire territory of the Soviet Union on the basis of aerial photographs. During the second world war, America produced the World Aeronautical Chart by means of 18 million square miles of aerial photography, a chart designed to make aerial transport safer. As examples of opening up little known areas, Professor Schermerhorn not only mentioned the production of good topographical maps on scales of 1 : 250,000 and 1 : 100,000 of the enormous areas of the earth's surface of which so far we have little more than sketch maps, but also explained how the administration of landed property in the form of a cadastral system, so essential for all agricultural development in the huge stretches of natively owned land in the countries of Africa and Asia, would be an impossibility were it not for some simplified system of aerial survey.

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* See the article entitled "The Dwingeloo Radio Observatory" in Vol. III, No. 3 (September 1959) of this Bulletin.

The building up of an economic inventory of natural resources must be reckoned as part of the work of development. The professor supplied information about a rough estimate which had been worked out at the International Training Centre for Aerial Survey at Delft to arrive at an initial geological, soil and forestry inventory, covering the whole of Africa, Latin America and Asia, excluding Russia and Communist China. As regards cost, by combining the interpretation of aerial photos on a scale of 1 : 70,000 with ground control for part of the total area involved, amounting to 63 million square kilometres, they had arrived at a total estimate of approximately 2½ milliard Dutch guilders ($1 : 3.6 guilders). It seems at first sight that a lesser objection than the money involved would be the possibility of attracting the number of experts required to complete such a project, say, in 10 years. Professor Schemerhorn showed that this would scarcely be possible of achievement without association with a programme of training.

INTERNATIONAL COURSES

Summer course 1961

National Values in a World Community

"National Values in a World Community" was the theme of the Summer Course organized by NUFFIC for 1961 and held at the University of Amsterdam from July 11 to July 27 last. National values were not merely the subject of lively discussion but were represented in the flesh by the presence of 60 students from 15 different countries. During a period of rather more than 14 days they studied the engrossing problems involved by the task of arriving at a world community. It was no easy undertaking but it did prove a highly interesting one. One important question demanding an answer was : what is a world community ? Together with Professor Schlichting, the participants asked themselves what the unifying principle of a world community is. It may be biological, yet "the biological union of the human race does not in itself constitute a moral community". We often think of a world community as an exalted ideal, the realization of which, if ever possible, must be an exceedingly complicated task, requiring centuries for its fulfilment. Young people who discover a great discrepancy between this ideal and the realities of the present need not, however, be discouraged as a result, if they proceed from a more concrete concept. The fact is that, despite powerful counter-forces, various tendencies towards regional world communities exist and they seem to be increasing in number. Autarchy has long ago been discarded as a solution. The community of needs has become a stringent reality in the world-wide interdependence of the nations for their safety, their economic standard and their technical progress. In addition, a "community of danger" (a term coined by Professor Schlichting himself) has come about in the face of the real menace of universal destruction through nuclear wars. The world is divided, but besides the struggle for power, we can also discern an endeavour to achieve a moral community, expressed in a growing consensus of opinion about human rights, crimes against humanity etc. Current events will not allow us to adopt a passive attitude – of this the participants in the course were convinced. The problem is : what can individuals, who want to do something, contribute to a trend that is largely determined by world politics ? One thing they can do is to study the trend. In consequence, the course was characterized by a unanimous will to analyze what is going on in the world today.

Twelve Dutch political and social scientists and one American professor functioned as mentors, to guide this endeavour. Their interesting lectures acted as stimuli for a keen exchange of ideas in the discussion groups, in which a spirit of realism and the will to get to know each other's point of view and to co-operate went hand in hand. This made it possible to provide at least tentative answers to a few important practical problems. One of these problems is the existence of stereotypes and prejudices. The world consists of a great variety of cultures. The impossibility alone of getting to know every one of them results in prejudices which may form a barrier to good understanding among the nations. Here lay one of the concrete results of the course : the participants did become aware to an extent of this diversity of cultures *and* of their own prejudices and attitudes. "Begin with yourself" from the well known saying about improving the world acquired real substance here. Prejudices were encouraged by numerous factors. Existing ideologies help to foster them, and they become a serious handicap to world communication once they assume rigid forms. Tolerance, greater exchange of opinions and more mutual understanding can form a counterweight. New means of communication make the world a smaller place ; there is more exchange of people and of cultural riches ; young states are playing a larger role in world events. It seemed of great importance that this last-mentioned fact should be studied more closely.

At the end of the course, therefore, attention became concentrated on the problems of Africa and Asia, and thanks in part to the participation in the course of people from these continents, we were able to obtain a deeper insight into these problems. It was felt as a great disadvantage that there were no participants from the countries behind the Iron Curtain.

There was great variety in the programme, not least because those taking part were offered a look at our own country besides being confronted with world-embracing problems. Many excursions, receptions, museum visits, contacts with Dutchmen and illustrations to the lectures offered the participants every chance of making their stay in Amsterdam a pleasant event.

INTERNATIONAL SCIENTIFIC MEETINGS

Inter-academic meeting of students of the Cultural Anthropology and Sociology of non-Western Peoples

From 8th to 10th May last a gathering was held at Leyden University of students from various academies and countries concerned with the subjects of the Cultural Anthropology and Sociology of non-Western Peoples. The theme of the congress was entitled "The Impact of the West and Social Change". Both students and teachers displayed a great interest in the congress, which was attended by no less than 142 students in all, 113 being Dutch, with 6 Germans, 2 Danes, 2 Swiss, 1 Portuguese and 18 foreign students working at Dutch institutions of higher education and coming from Indonesia, Japan, the Netherlands Antilles, Nigeria, Pakistan, Surinam and the United States.

The organizing committee had succeeded in attracting a number of speakers of renown, including Dr. Wolfgang Franke, professor of Sinology in the University of Hamburg and director of the Seminar on the Chinese Language and Chinese Culture, who has worked for years as a professor at various Chinese universities and who spoke on "The Impact of the West and Social Change in China". The ensuing discussions were led by Dr. E. Zürcher, recently appointed as a lecturer on Chinese in the University of Leyden. Other speakers were Professor C. Etienne of the University of Geneva, on "India" and Dr. John Middleton, lecturer in Anthropology at University College, London, and, prior to this, Senior Lecturer in Social Anthropology in the University of Capetown, who spoke on "The Impact of the West and Social Change in East Africa". The final address was delivered by Professor S. Hofstra, who lectures on the history and the problematics of sociology in the University of Amsterdam.

The congress was declared open by the Rector Magnificus of the State University at Leyden, Professor Mr. J. V. Rypperda Wierdsma, who, in welcoming professors and students from home and abroad, stressed the need for a new orientation of the Western conception of non-Western peoples, a theme which was dealt with further by the chairman of the congress committee, Mr. J. Vredenbregt. The passages in his address dealing with this subject follow below.

It is not without significance that the representatives of what we know as our "non-Western" branches of study should turn up here in a body, for the simple reason that it is useful to make the world aware of the existence of these branches, whose *explicit* aim it is to devote academic study to non-Western societies. For the growing significance of the non-Western world, due not least to the steady progress of the de-colonization process and the great social, economic and political changes taking place in them, requires the attention of men of science and at the same time compels us to revise the view – still often traditional – which is taken, to our own loss, of this non-Western world. Political developments in the world during recent decennia have forced every responsible-minded citizen to give thought to this subject. The main problem it confronts us with is that of rendering effective help to assist these countries in their development. In rendering this help it is often found in practice that all manner of barriers are not only not overcome but not even discerned. I may assume that the very often inexpert, superficial and politically-biased information on non-Western countries – where the reigning situation differs so widely from that in our own society – and the simplified image of these countries which many people here in Europe form as a result, are known to you all. And I may be allowed to mention too that many people, including those in responsible positions, fail to acquire a proper and responsible idea of the problems involved by the so-called underdeveloped countries. But what gives cause for greater concern is the fact that half-baked idealism often threatens to transform the aid given into its very opposite, since people are often too inclined to give good intentions and idealism pride of place and to seek to hide too great a measure of ignorance under the cloak of brotherly love. How many doctors, veterinary surgeons, agriculturalists, engineers, economists and other technicians leave for countries in Asia, Africa and Latin America, without having first acquired an understanding – a highly necessary understanding – of the entirely different social forms and hierarchy of values they will meet with there – which differ so essentially from what they have assumed to be a matter of course and quite normal in their own world, as a result of the lack of even the most rudimentary anthropological training. How many of Unesco's projects have not failed, or at least come in for serious criticism, owing to the too facile Western optimism about progress shown by these technologists. The despatch to the so-called under-developed areas of idealistic technicians is, of course, a necessity, though we ought to realize that idealism and technical knowledge are not enough in themselves. The problem is not simply to introduce Western techniques into these countries in the shortest possible time and to familiarize the local population with them. The main thing which concerns socially progressive governments in these lands is to bring about, or to accelerate, social change there in such a way that the population sees, of its own accord, to the further progress of the process, once it is set going, and at the same time to remove as far as possible the tension and friction to which this process of social change can give rise. Here lies an important task for the social anthropologist. Social anthropologists should be associated with the work of drawing up development schemes etc., in these technically underdeveloped countries, if anywhere. They can function as a kind of efficiency link, which saves the aforementioned technologists having to go through the trial and error phase and offers them the possibility of doing fruitful work in these areas. Seen in this light, President Kennedy's plan to send out a "peace corps" of technical experts for some years has highly dubious aspects. This plan, which already seems to be being taken as a model for imitation in the Netherlands among other places, does indeed bear witness to idealism but not by any means always to wise understanding.

An intensive course of training on "underdeveloped areas" must necessarily lead to most of those concerned beginning by underestimating the problems that lie ahead of them and falling short in real understanding of the people with whom they will be co-operating. When they have gained some experience and obtained greater insight into the essentials of the problem confronting them, it will already be time for them to leave the country, where they will have done more harm than good.

I should like in this connection to draw attention to the all-round acquaintance with the problematics of the non-Western countries – which certainly seems desirable – and an opportunity to make which is offered by "non-Western" studies here in the Netherlands, especially to those choosing Social Anthropology as their subject. In addition to general sociology and economics, these courses pay special attention to anthropology, the science of cultures, the evolution of law, the economic aspects of underdevelopment, and to the language, religion and contemporary history of these areas. In my view it requires little imagination to grasp that an adequate course of training of this kind is to be preferred to the superficial knowledge of the subject or one-sided interest to which resort is all too often had. To quote Professor van Lier of this university: an intermediate form does not exist – it is pure amateurism.

I hope, therefore, that this congress may be, among other things, a reflection of the subjects with which the study of the cultural anthropology and sociology of non-Western peoples is particularly concerned, and further that it may fix attention upon the entirely individual approach which is called for by the scientific study of non-Western forms of society and the problems which arise as a result of rapid social change within them.

International Congress on Comparitive Literature

The annual meeting of the Association Internationale de Littérature Comparée was recently held, after the 3rd International Congress on Comparative Literature, which lasted from the 21st to the 26th of August, came to an end at Utrecht University.

At this meeting it was decided to hold the next congress in August 1964 in Fribourg, Switzerland. Professor W. A. P. Smit was elected chairman of the European section of the Association for the 1961/1964 period, and Dr. R. Wellek, professor at Yale, chairman for the Western Hemisphere.

Nineteen full-length adresses were delivered during the congress, while lively discussions were held in addition, on the basis of 43 shorter lectures given in the three sections. On this occasion delegates from a number of East European countries took part in the congress, as did also delegates from Pakistan,, Japan and Korea. Mr. N. A. Beg also attended as official representative of Unesco.

Symposium on shell research

An international symposium on shell research was recently held from August 30 to September 2, 1961, at the Technological University at Delft. This research has chiefly to do with shell roofs of reinforced or pre-tensed concrete and is carried out under the auspices of two international organizations, the Réunion Internationale des Laboratoires d'Essais et des Recherches sur les Matériaux et les Constructions, a research organization, and the International Association for Shell Structures, the international shell society.

The symposium was inaugurated on Wednesday morning, August 30, in the Assembly Hall of the Technological University at Delft, addresses being delivered on this occasion by the Chairman of the Board of Governors, Dr. Ir. F. Q. den Hollander and the Chairman of the symposium, Professor Ir. A. M. Haas. In the evening there was a reception at which the Rector Magnificus of the University, Professor Dr. R. Kronig, acted as host to the participants.

Great interest was shown in the symposium and specialists from all corners of the world, about 175 in number, took part in it.

The addresses and discussions were interrupted on Friday morning, September 1, for a visit to the Stevin Laboratory in the Technological University, and also to an interesting shell roof construction under construction at the moment, namely, at the Touring Club Building (A.N.W.B.) in The Hague.

On Saturday, September 2, the symposium was brought to an end with a general report, after which there was a dinner in the Kurhaus at Scheveningen.

International Seminar "Scientific and Technical Personnel"

The Research Institute for Management Science will be organizing an international seminar on "Scientific and Technical Personnel" at Delft, from November 21 to 25, 1961.

Information: Research Institute for Management Science, 76, Nieuwe Laan, Delft.

XXII International Congress of Physiological Sciences

This congress will be held in Leyden from 10th to 17th September 1962 under the auspices of the International Union of Physiological Sciences (I.U.P.S.). As in the case of previous congresses the programme will comprise a number of symposia and addresses. Films will also be shown and demonstrations arranged.

Members of affiliated and supporting unions should register for the congress with the secretariat of their own organization. Those who live in a country where such a body exists but who are not themselves members as also those living in countries where there is no such organization may apply direct to the congress secretariat.

Application forms should be submitted not later than January 1, 1962.

Information : Secretariat of the Congress, Postbox 133, Leyden.

For information regarding accommodation, social events etc., please apply to the Holland Organizing Centre, 16, Lange Voorhout, The Hague.

LIBRARIES AND MUSEUMS

The Jewish History Museum in Amsterdam

The Jewish History Museum which occupies the upper storey of the Weigh House in Amsterdam, likewise the home of the Amsterdam Historical Museum, was opened in 1932. But the war years and the atrocities of which the Jewish citizens of the Netherlands were the principal victims, have given it a new significance. Now that the streets in the vicinity of the Weigh House are no longer a pulsating centre of Jewish life, but only a pale shadow of a rich and fascinating past, the Jewish History Museum has acquired a new and sad task: it has become a monument to a glorious past, the memory of which it preserves from oblivion.

The Jewish History Museum sets out to give the visitor an impression of the part played by the Jewish people in Dutch communal life. Understandably, the stress has fallen on the visible attributes of Jewish religious life, on the objects used in public worship in the synagogues and in the religious life of the family circle. The cooperation of the Portuguese-Israelite and the Dutch-Israelite communities and the enthusiasm and flair of the curators and of the former director of the museum have made it possible to build up a valuable collection of objects and works of art pertaining to Jewish rites, a collection that can give the visitor who is unfamiliar with Judaism a clear and vivid picture of the customs, precepts and atmosphere of Jewish religious life.

The centre of this collection is of course the Bible, since the Jewish religion has always revolved around this Book. Nevertheless the visitor to the museum will seek in vain for the Hebrew Bible, the Scrolls of the Law. For in Jewish ritual the role played by the Bible (the Torah) is such that it may only be displayed in consecrated places. However, the museum contains numerous other manuscripts and printed books of a less sacred nature, which are certainly in their right surroundings here. Among them are prayer-books *(machzorim)*, translations of the Bible, the Scrolls of Esther, as used at the Purim festival commemorating the salvation of the Jews by Queen Esther, and the Books of Haggadah, which are read from on the first two evenings of the feast of the Passover.

The latter two types of books, the Scroll of Esther *(Megillah)* and the Haggadah, are the only Jewish books that – contrary to the otherwise strictly observed first commandment – contain illustrations, which are sometimes imbued with the liveliness and verve of genuine folk-art.

The museum likewise possesses many ritualistic *objets d'art* which have an immediate bearing on the Torah. Most of these are products of the art of the silversmith, which serve to embellish the Scrolls of the Law and are part of the ritual of the reading of the Bible. For the silversmith's craft is traditionally Jewish. It is not without reason that the name Goudsmit (Goldsmith) is a well-known Jewish name. Three kinds of silver articles are closely linked with the Scrolls of the Law: the ornamental tower, i.e., the two silver mountings on the two staffs on to which the parchment is rolled; the *thera* shield, i.e., the silver plate which is attached to the velvet cover round the Scrolls and on which the name of the donor, the date and name of the community receiving it are often engraved; and the marker – a silver stick, usually in the shape of a hand *(jad)*, which is used to follow the text word by word during the daily Bible-reading. Most of these objects are examples of highly developed ornamental art. Although their main characteristics are strictly traditional, their decoration and ornamentation is nevertheless often richly imaginative, subtle and in perfect taste. The ornamental towers are sometimes replaced by a crown symbolizing the Law as ruler over every group, and in the Amsterdam community these crowns are modelled on the imperial crown of the Amsterdam coat of arms. From this can be seen how close the ties are that bind the Amsterdam Jews to their city – *mokum*, from *makom*: the place, or even *mokum aleph*: place number 1. And this attachment is manifested in numerous other objects too. Apart from the silver attributes to the Scrolls of the Law there are a great number of other fine silver, copper and bronze articles closely connected with ritual: the *kiddush* cups, used during the eulogy at the beginning of the Sabbath, of which the museum has several fine specimens from the eighteenth century; the graceful spice-towers which are used at the ceremony concluding the Sabbath on Saturday evening: delicately constructed towers, frequently decorated with filigree work and containing sweet smelling herbs; silver pitchers and bowls which were used by the Cohanim (the priestly tribes) for washing their hands, and by the Levites in the synagogue before giving the ancient blessing. Some of these ceremonial pitchers are among the choicest specimens of Dutch craftsmanship of the early eighteenth century.

And then of course there are the silver and copper Sabbath lamps and Maccabean lamps. A lamp of this kind appears already on the reliefs depicting the looting of the temple at Jerusalem on Titus's Arch in Rome, and is now incorporated in the coat of arms of the young state of Israel. The museum possesses an extensive collection of these finely worked brass candelabra and of the eight-branched Maccabean lamps in silver or bronze which bear witness both to the attachment to traditional sacred forms and to the richly imaginative way in which the artists and craftsmen managed to weave numerous new ideas, variations and forms into the old prescribed designs. Such pieces are likewise a testimony to the continuity of Jewish ritual art – a continuity that has its roots in Jewish life and history – and a tribute to the ingenuity and originality of the artists as well as their patrons, who were not content with the mere repetition of old designs but who wished to breathe fresh life into the traditional forms for a new generation.

One or two of these ritualistic objects have always resisted change. First, as has already been mentioned above, the handwritten Bible itself, the Torah, and secondly, the ram's horn or shophar which is blown on New Year's Day and on the Day of Atonement. Both are bearers of a direct Biblical tradition and as such admit of no changes in decoration or design. Just as the word of the Bible has been handed down from generation to generation, unchanged since the days of Sinai, and is read today from the same scrolls, so too are some of the Jewish religious practices directly descended from Biblical tradition. And the closer these practices lie to the centre of Jewish religious life, the more strictly the ancient form, the sacred tradition, will be preserved. All the changes take place on the periphery – the core of Jewish religious life, the ten commandments revealed at Sinai, remains untouched. For the museum visitor the objects used in the synagogue and in domestic ritual are a vivid proof of this.

However, there is more to be seen in the museum than such articles alone. It also houses a collection of paintings, drawings and prints illustrating Jewish life in Amsterdam and the Netherlands. From the early eighteenth-century drawings and prints depicting the Jewish festivals by Bernard Picard to the paintings of the recent past by M. Monikkendam and G. J. Staller, these works demonstrate how close the ties have been between Amsterdam and its Jewish citizens. Even the dark days of the war could not sever these ties, although only 14,068 of the 79,410 Jewish inhabitants of Amsterdam survived them.

It is the task of the Jewish History Museum to give a picture of the place the Jewish people have occupied in Dutch community life. If it is to fulfil this task, then the suffering and disaster that overcame Dutch Jewry in the war years cannot be ignored. Hence, with the aid of the National War Documentation Library, a small collection of documents has been compiled in order to keep alive the memory of those dark years; not only the misery suffered by thousands but also the help rendered by thousands of others form part of the history of Amsterdam Jewry. These documents reveal with their plain facts the depth of misery suffered better than any reconstruction of events or historical evaluation could.

The history of the occupation does indeed fall within the sphere of the museum's activities, but fortunately there are other aspects of Jewish life in Holland, both in the present and the past, which assume pride of place in the museum's display.

Many have assisted in making of this museum a historical centre which illuminates various aspects of the Jewish religion, provides a picture of the lasting contribution of the Jews to Dutch life, and keeps alive the memory of what has been lost.

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RIETVELD, ADRIAAN OTTO. *Transportverschijnselen in gasmengsels.* (Transport Phenomena in Gaseous Mixtures). Leyden, 1961.
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RIJKE, ARIE MARIE. *Crosslinking in Solution. Studies on Cellulose Acetate Networks.* The Hague, 1961.
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Technical University at Delft.

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Technical University at Delft.

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State University at Utrecht.

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State University at Utrecht.

MISCELLANEOUS

Professor Waterink takes his leave

On May 26 last, having reached the age of 70, Dr. J. Waterink, professor of psychology and pedagogy in the Free (Reformed) University at Amsterdam, brought his work to an end with a final lecture attended by a very large gathering, which included H.R.H. Prince Bernhard, countless authorities, colleagues and students.

Professor Waterink did his own study at the School of Theology at Kampen and at the Free University in Amsterdam and prior to occupying his chair at the university was for thirteen years a minister of the Gereformeerde (Calvinist) Church. His experience as a teacher of scripture at secondary schools confronted him with problems of teaching and education. This caused him to go to Bonn, in Germany, to study psychology, after which he took his doctor's degree, with first class honours, at the Free University in 1923 with a dissertation entitled "The Place and the Method of the Professional Subjects". He became a professor at the Free University in 1929, where he was faced with the task of developing a new subject of study.

Convinced of the significance of psychology and pedagogics to social life as a whole, he succeeded in lighting upon many concrete possibilities for their practical application. Contact with ordinary life has, on the other hand, always provided rich material for his own scientific deliberations.

Professor Waterink has also played an influential role as a theologian, that is, as an associate professor, since 1926, of catechetics.

His work has found recognition abroad too. He went twice to South Africa as a guest professor and taught for a year at Calvin College in the United States. The universities of Potchefstroom, South Africa, and of Ghent, in Belgium, have both conferred honorary doctorates on him. Professor Waterink's farewell lecture was devoted to the subject, "Principles and authority in present-day psychology and pedagogics". Among the things he said was that in recent years a change of attitude could be detected, as a result of which little often remained over of authority. Psychologists and pedagogues now felt a certain need to turn back along this path. However, it still seems difficult to get beyond the opinion that the essence of authority lies in its demonstrable usefulness in the community. Obedience, because the law, order or rule is the norm, is still very often rejected.

Georgetown honorary doctorate for Professor Schlichting of Nymegen

On June 8, 1961, Georgetown University, Washington D.C., conferred an honorary doctorate of law on Professor L. Schlichting, who lectures on political science and the theory of publicity in the Roman Catholic University at Nymegen.

Rector magnificus of Nymegen University from 1959 to 1960 and at present Pro-rector of the Academic Senate, Professor Schlichting has always had many contacts with the United States and the American universities, including Georgetown, the oldest Roman Catholic university in the States. During a month's visit he visited many universities in America, going on to Canada, where he was residing as a press attaché at the time of his appointment at Nymegen in 1950. While in America, Professor Schlichting has invited two professors from Georgetown University to come to Nymegen to deliver guest lectures.

Dr. J. Brugman, professor of Arabic and the history of Arabian civilization at Leyden

On April 28 last, Dr. J. Brugman acceded to the chair of Arabic and the history of Arabian civilization at the University of Leyden with an address entitled, "Islam and Arabian Nationalism".

Dr. Brugman, head of the Africa Office of the Africa and Middle East Directorate at the Ministry of Foreign Affairs, studied Semitic literature and law at Leyden, taking his doctoral examination in both subjects. He entered the Foreign Service in 1948, after which Cairo became his place of office until 1960. In March of that year he obtained the title of doctor (with first class honours) with a dissertation entitled: "The significance of Mohammedan law in modern Egypt".

In his inaugural address Professor Brugman pointed out that it was still disputed whether the prophet Mohammed had sought to preach Islam to the Arabs alone or whether he had wanted to bestow on his preaching a universal character. After the death of the Prophet, his disciples founded an Arabian empire in which the Arabs constituted a ruling aristocracy. This empire endured for only one hundred years, after which it became an Islamic state, though Arabic remained the language used in religion and science. When an end had come to the dominant position enjoyed by the Arabs, a large proportion of the population of the subject countries continued to be absorbed so that nowadays they regard themselves as Arabs. In the Islamic empire, however, the question of nationality eventually fell into the background, a natural balance being maintained between the various nationalities concerned.

This equilibrium was disturbed by contact with Western forms of life and civilization, which began to make themselves felt even in those places where the European powers had not obtained political control. The spiritual challenge from the West was felt strongest of all in Egypt, where, to begin with, it was responded to by Islam. In the first half of the 19th century there was no question of any nationalism, either Egyptian or Arabian, in Egypt. In the eastern Arabian lands, where the Arabs were originally in a relatively favourable position in the Ottoman Empire, Arabian nationalism developed as a reaction to the Turkish nationalism of the Young Turks. The Christian Arabs in these countries formed the vanguard of this Arab nationalism, which after the 1914-1918 war became an ideology. About the turn of the century Pan-Islamism still dominated in Egypt for a period and it was only afterwards that a purely Egyptian nationalism began to develop. In the 'thirties, however, mainly due to developments in Palestine, Egypt gradually became involved in events in other Arab lands and since then Arab nationalism has continued to gather strength there.

As a result of Arab nationalism Islamic movements have now fallen into the background. Generally speaking, the contradiction between Islam and nationalism is not acutely felt, although there have been many Moslems, particularly in Egypt, who were aware of it. The question accordingly arises whether Arab nationalism in its present form is to be seen as a phenomenon entirely dissociated from Islam. The fact that the Arab Christians have lost ground, despite their services to Arab nationalism in the past also indicates that nothwithstanding the apparent antithesis, the idea of the *umma*, of the Islamic community of the faithful, still plays a role. Although on the surface the concepts of the modern state and citizenship of a state have found acceptance, there are several things that point to the existence of a substratum of Islamic thought and which show that Islam is accordingly still a factor of significance.

Address delivered by Professor Bouckaert (Belgium) before a meeting of the Netherlands Royal Academy of Sciences and Letters

Professor Dr. J. P. Bouckaert, professor and dean of the Medical Faculty at the State University of Ghent (Belgium), also Chairman of the Natural Science Department of the Belgian Academy of Sciences, Letters and Arts, delivered an address to the Natural Science Department of the Netherlands Royal Academy on April 29 last, the title being "The Population Problem from the Biological Angle".

In a period of 43 years the population of the world has doubled and it will not be long before it has reached the 3,000 million mark. This explosive expansion has lasted for a few generations only. In the countries of Western Europe, where the phenomenon appeared at an earlier stage, a declining trend is to be observed after the initial rising trend in population expansion.

Animal populations, like all biological systems, show evidence of auto-regulation. Expansion is automatically checked by factors dependent upon density (shortage of food, beasts of prey, diseases), which diminish the phenotypical fertility or increase the death rate. Genotypical fertility is determined by natural selection. Over or under-fertile groups are eliminated.

In man's case, as living conditions improve, the population expands mainly owing to a lower death rate. The checks in his case occur in a way which differs from that operating among animal populations. Genotypical fertility is not diminished by natural selection. Phenotypical fertility is diminished, but not by the effect of factors dependent upon density. Birth control has come about not as a result of biological evolution but due to human evolution. Professor Bouckaert was of the view that birth control which required no pains or denial but which was practised for egotistical reasons brought about no true adaptation and was not warranted biologically.

New foreign members of the Netherlands Royal Academy of Sciences and Letters

A Royal Order in Council recently confirmed the nominations of Professor F. C. Bawden, Professor Sir Stewart Duke-Elder and Professor W. Sierpinski as members of the Royal Academy and the nomination of Dr. N. P. Badenhuizen as a correspondent.

E. C. Bawden is an international authority on virus diseases in plants. Since 1958 he has been the Director of the Experimental Station at Rothamsted, Harpenden, England. A highly important book of his is *Plant Viruses and Virus Diseases.*

Sir Stewart Duke-Elder may be referred to as one of the chief ophthalmologist of our day. His *Textbook of Ophthalmology* (7159 pages) has found its way all over the world. In London he is the organizer and guiding spirit of the Institute of Ophthalmology, where the research work of all the great eye clinics of London and the surrounding area is concentrated. He is a leader in numerous other fields as well. Among other things, he is Chairman of the International Council of Ophthalmology and is attached to several hospitals as eye surgeon. Sir Stewart has received countless awards for his outstanding services.

W. Sierpinski is President of the Polish Academy of Science, professor emeritus of mathematics in the University of Warsaw and founder of the Polish School of Mathematics.

Dr. N. P. Badenhuizen was professor of general botany and genetics in the University of Johannesburg from 1950 to 1960. In the latter year he accepted the chair of botany in the University of Toronto.

Prof. Baur Guest Lecturer

During the course 1961/62 Dr. Edward Jackson Baur, Professor of Sociology and Anthropology, University of Kansas, U.S.A., will be acting, as a guest professor under the Fulbright act, in the Department of Political and Social Sciences (Division C: Social Psychology and Social Pedagogics) of the University of Amsterdam.

According to his main interests he will give lectures on social control and teach research methods in the social sciences. Besides, groups of students will have the opportunity to benefit from his broad experience in the fields of community organization and juvenile delinquency.

BASIC DATA ON INTERNATIONAL COURSES OFFERED IN THE NETHERLANDS *

(see also the "International Courses" Section in this Bulletin)

Institute of Social Studies

Information: The Rector of the Institute of Social Studies, 27 Molenstraat, The Hague. Tel. 070-630550

COURSES OFFERED:

a. Two year Course in the Social Sciences, leading to the degree of Master of Social Sciences.

REQUIREMENTS FOR ADMISSION: Advanced academic standing in one of the social sciences.

b. Seven-month Course in Social Welfare Policy, leading to the diploma in Social Welfare Policy.

REQUIREMENTS FOR ADMISSION: Practical experience in social work, preferably at the teaching and public service level.

b. special. Specialization in Mother and Child Welfare Policy, within the framework of the Social Welfare Policy Course. Dates and conditions: see (*b*).

c. Four-month Course in Comprehensive Planning.

REQUIREMENTS FOR ADMISSION: Graduate standing in social sciences, engineering, architecture or agriculture and broad experience in one of the various fields of planning.

d. Six-month Course in Economic Planning and National Accounting, leading to the diploma in Economic Planning and National Accounting.

REQUIREMENTS FOR ADMISSION: Academic standing at graduate level in economics and/or broad experience in planning, national accounting and statistics.

NEXT COURSE STARTING: January 1962.

e. Six-month Course in Public Administration leading to the diploma in Public Administration.

REQUIREMENTS FOR ADMISSION: Advanced academic status and broad experience in the public service or as a staff member in institutes of public administration.

NEXT COURSE STARTING: January 1962.

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* Courses are given in English only, unless otherwise mentioned.

e. extended. One-year study programme leading to the degree of Master of Public Administration.

REQUIREMENTS FOR ADMISSION: Candidates for this programme must either have attended the Course mentioned under (*e*) or another Course in Public Administration, approved by the Institute, with study results rated above average.

a–e. previous. Four-month Orientation Course for non-English speaking students. In this course non-English (especially French-) speaking students are trained to acquire a working knowledge of the English language, in order to be able to attend one of the courses mentioned above under (*a*) to (*e*). Each course starts four month earlier than the main course.

Technological University at Delft Netherlands Universities Foundation for International Co-operation

Information: NUFFIC, 27 Molenstraat, The Hague.

COURSE OFFERED:

International Course in Hydraulic Engineering. Three branches of study:

1. Tidal and coastal engineering;
2. Reclamation;
3. Rivers and navigation works.

The course lasts eleven months and leads to a diploma.

REQUIREMENTS FOR ADMISSION: a degree in engineering of a recognized institution of higher learning.

Technological University at Delft Netherlands Universities Foundation for International Co-operation

with the assistance of the Organization for European Economic Co-operation, and the World Health Organization.

Information: NUFFIC, 27 Molenstraat, The Hague.

COURSE OFFERED: European Course in Sanitary Engineering; dealing with the struggle with water pollution in densely populated regions.

REQUIREMENTS FOR ADMISSION: A university degree in civil engineering or a related branch of study, and some practical experience in civil engineering.

The numeral clausus for admission has been fixed at 20 participants.

International Training Centre for Aerial Survey

Information: The Dean of the International Training Centre for Aerial Survey, 3, Kanaalweg, Delft. Tel. 01730-21980

COURSES OFFERED:

a. Photogrammetry, including cartography, topography and theory of errors; After certain conditions have been fulfilled it is possible to obtain the I.T.C. degrees of Bachelor or Master of Science in Photogrammetric Engineering;
b. Air photography and survey navigation;
c. Photogeology;
d. Use of air photographs for soil survey and other agricultural purposes;
e. The same for forestry and other sylvicultural purposes;
f. Aerial survey and regional development (a 3 month's course).

Lectures and instructions are given in English; French classes only if there are more than 3 participants.
Courses are adapted to individual needs and may therefore vary from some months to two years. Regular photogrammetric courses take between 1 and 2 years; courses in photo-interpretation between 6 months and 1 year.

REQUIREMENTS FOR ADMISSION: Dependent upon the individual student's programme of study. For interpretation courses *c*, *d*, *e* only those applicants can be accepted who have either some university degree in the corresponding subjects or an equivalent other preliminary education and experience.

COURSES START in January and September of each year except the courses *e* and *f* which start in January only.

Research Institute for Management Science

Information: Research Institute for Management Science. 76, Nieuwe Laan, Delft.
Tel. 01730-26990

COURSE OFFERED:

International Course on Small-scale Industries. Theoretical and practical training in investigating and solving the specific management problems of small-scale industries. and in the methodology which can be applied to the establishment and promotion of new industries. Successful attendance of the course leads to a diploma.

REQUIREMENTS FOR ADMISSION: BSc or MSc or equivalent degree of a recognized university.

NEXT COURSE: November 7, 1961 until April 27, 1962.

Institute for Atomic Sciences in Agriculture (I.T.A.L.), Wageningen

Information: Dr. D. de Zeeuw, Institute for Atomic Sciences in Agriculture, 8, De Dreyen, Wageningen, Postbus 48. Tel. 08370-3118

COURSES OFFERED:

Under the auspices of the International Atomic Energy Agency (I.A.E.A.) and the Food and Agricultural Organization (F.A.O.). I.T.A.L. will organize an international course on "Radio-Isotope Techniques in Soil and Plant sciences".

REQUIREMENTS FOR ADMISSION: advanced academic status in the fields of biology or agricultural science.
The numeral clausus for admission has been fixed at 20 participants.

International Agricultural Centre at Wageningen

Information: Director, International Agricultural Centre, 1, Generaal Foulkesweg, Wageningen. Tel. 08370-3173

COURSES OFFERED:

Research and specialization facilities in special branches of agricultural science, after completion of which a certificate is awarded. Training is adapted to individual needs and may vary from 3 to 12 months.

REQUIREMENTS FOR ADMISSION: in general M.Sc. or equivalent degree of recognized universities or colleges.

Bouwcentrum (Building Centre)

Information: Bouwcentrum, P.O. Box 299, Rotterdam. Tel. 010-116181

COURSE OFFERED:

International Course on Building in co-operation with the central organization for Applied Scientific Research in the Netherlands, T.N.O., and the International Federation of Housing and Planning. The Course is on the graduate level and lasts six months. Its object is to present a systematic basis for the treatment of the problems encountered in the building industry and to suggest a number of practical methods for tackling these problems. By attending lectures, taking part in discussions and excursions, as well as practical work, the participants gain knowledge and experience. Architects – working as designer or as builder – as well as civil engineers are able to take part in the course as a result of the possibility of specializing during the course.

The Philips International Institute of Technological Studies

Information: Director of Studies, Philips International Institute, Eindhoven.
Tel. 04900-60000, ext. 3835

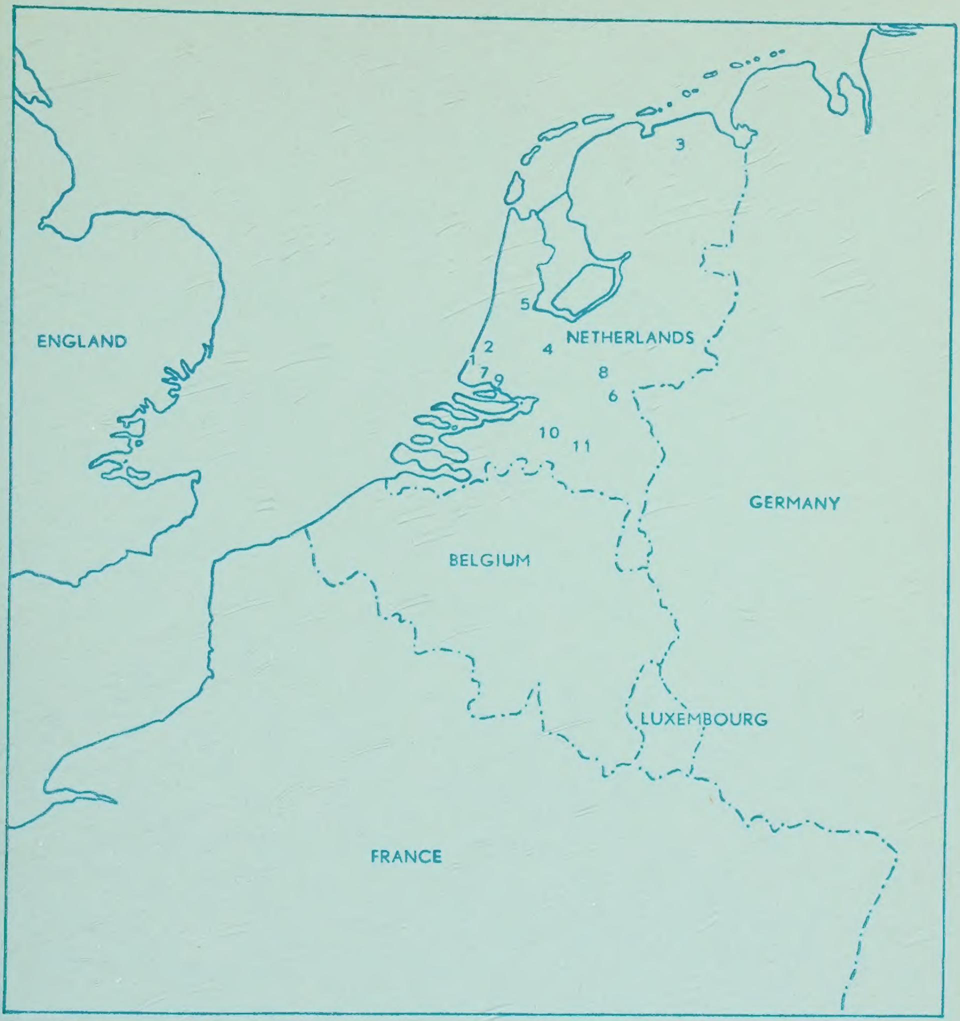
COURSES OFFERED:

a. Individual, theoretical and experimental curricula on any subject within the range of Philips' activities; for instance, electronics and applications thereof, X-rays, light and lighting, etc.
b. Three-month course of lectures on basic electronics (October-December).
c. Three-month advanced-level course of lectures. The main subject of this course may differ from year to year but will generally be related to some form of applied electronics.

Teaching language is English. Nominal duration of a completed period of study is one year.

REQUIREMENTS FOR ADMISSION: a graduate science or engineering degree.

NEXT COURSES: In view of the individual character of the study, students may enter upon their course at any date; the courses mentioned will, however, usually start in October and February.



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